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Fay Chong JR.

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SUN MICROSYSTEMS, INC. c/o DORSEY & WHITNEY, LLP
370 SEVENTEENTH ST.
SUITE 4700
DENVER, CO 80202

EXAMINER

LE, MIRANDA

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/748,410	Applicant(s) CHONG, FAY	
	Examiner Miranda Le	Art Unit 2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-16,18-30 and 32-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2, 4-16, 18-30, 32-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This communication is responsive to Amendment, filed 04/05/07.

Claims 1-2, 4-16, 18-30, 32-46 are pending in this application. Claims 1, 15, 29, 43 are independent claims. In the Amendment, claims 3, 17, 31 have been cancelled, and claims 1, 4, 11, 15, 16, 18-29, 32, 34, 39, 43, 45 have been amended. This action is made Final.

2. The objection to the specification (drawings, claim objection) of the invention has been withdrawn in view of the amendment.

3. The rejection of claims 1-14, 29-46 under 35 U.S.C. §101 has been withdrawn in view of the amendment.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title.

5. Claims 15-28 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Although claim 15 recites "An article of manufacture...a machine-readable medium...", the claim fails to place the invention squarely within one statutory class of invention.

On page 9, paragraph [0042] of the instant specification, applicant has provided evidence that applicant intends the "medium" to include signals. As such, the claim is drawn to a form of energy. Energy is not one of the four categories of invention and therefore this claim(s) is/are not statutory. Energy is not a series of steps or acts and thus is not a process. Energy is not a

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physical article or object and as such is not a machine or manufacture. Energy is not a combination of substances and therefor not a composition of matter.

A machine-readable medium including carrier waves, or signals, is non-statutory subject matter as set forth in MPEP 2106 (IV)(B)(2)(a). As such, claim 15 is not limited to tangible embodiments, instead being sufficiently broad so as to encompass intangible media such as transmission media; the claims are not limited to statutory subject matter and are therefore non-statutory.

Claims 14-28 are dependent upon claim 15, suffer from deficiencies similar to their respective base claim, and therefore are likewise rejected.

It is suggested that the claimed "machine-readable medium" should be changed to "machine-readable *storage* medium".

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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7. Claims 1, 2, 4-16, 18-30, 32-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Innan et al. (US Patent No. 7,013,317), in view of St. Pierre et al. (US Patent No. 6,366,986).

As to claims 1, 15, 29, 43, Innan teaches a method for preserving data in a data storage system, the method comprising:

receiving a command to preserve data in the data storage system (*i.e. a second time, col. 2, lines 10-39*);

executing, for a first data, a first input/output (I/O) process directed to a first storage volume (*i.e. first storage, col. 2, lines 10-39*), wherein the first I/O process begins at a first time which is prior to receiving the command (*i.e. a first time, col. 2, lines 10-39*);

writing a second data directed to the second storage volume as part of a second I/O process which begins after the first time (*i.e. copying data of the first storage device stored in at least one of the data blocks indicated by the second update-management table as being updated to at least one of data blocks of the second storage device corresponding to the data blocks of the first storage device, col. 2, lines 10-39*);

modifying the data structure to indicate that the second data is stored in the second image and storing the second data in the second image (*i.e. making contents of the second update-management, col. 2, lines 10-39*).

Innan does not specifically teach creating a data structure, in response to the command, for at least a second image which corresponds to a second storage volume, the second storage volume storing changes to the first storage volume occurring after receipt of the command.

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St. Pierre teaches creating a data structure, in response to the command, for at least a second image which corresponds to a second storage volume, the second storage volume storing changes to the first storage volume occurring after receipt of the command (*i.e. forming a second backup that includes the changed segments from the time of the preceding backup to the second time, col. 5, lines 33-51*).

It would have been obvious to one of ordinary skill of the art having the teaching of Innan and St. Pierre at the time the invention was made to modify the system of Innan to include creating a data structure, in response to the command, for at least a second image which corresponds to a second storage volume, the second storage volume storing changes to the first storage volume occurring after receipt of the command as taught by St. Pierre.

One of ordinary skill in the art would be motivated to make this combination in order to store the differential backup in view of St. Pierre, as doing so would give the added benefit of having better performance of a backup storage system that includes tracking which of the physical segments have been changed since a preceding level zero backup, as taught by St. Pierre (*col. 5, lines 53-65*).

As to claims 2, 16, 30, Innan teaches the first storage volume is a first virtual logical unit (VLUN) and the second storage volume is a second VLUN (*Fig. 1*).

As to claims 4, 18, 32, Innan teaches acquiring a lock from a lock mechanism before modifying the data structure to indicate that the second data is stored in the second image; and

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releasing the lock after storing the second data in the first image (*i.e. a mirror-split request, col. 3, lines 53-64*).

As to **claims 5, 19, 33**, Innan teaches the lock mechanism is maintained independent to the first and the second storage images (*i.e. "mirror-split" refers to an operation state in which updating to the LU0 (31) is continued, but updating to the LU1 (32) is stopped, col. 3, lines 53-64*).

As to **claims 6, 20, 34**, Innan teaches receiving a third data being written to a data block of the second storage volume; updating the data structure to indicate the data block is stored on the second storage image; and writing the third data to the data block on the second image (*i.e. An "update-management bitmap" is a table for managing whether a process of updating of data stored respectively in the data blocks of the LU0 (31) and/or LU1 (32) has been carried out by turning on/off of the bits corresponding to the data blocks, col. 3, lines 40-52*).

As to **claims 7, 21, 35**, Innan teaches updating comprises: determining whether the data block is stored on the first storage image; and updating the data structure to indicate the data block is stored on the second storage image, if the data block is stored on the first image (*i.e. starting a process of managing whether updating is carried out or not to each of data blocks of the first and second storage devices using first and second update-management tables; the data blocks being respectively partitioned in the first and second storage devices; and the first and second update-management tables corresponding respectively to the first and second storage*

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devices and respectively indicating any update to each of the data blocks of the respective first and second storage devices; at a second time which may be after the first time or at the same time as the first time, col. 2, lines 10-39).

As to claims 8, 22, 36, Innan teaches examining a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the second storage image; and creating the entry associated with the data block if the entry does not exist *(i.e. a backup and storage system which has a method for managing first and second storage devices structuring a mirrored pair using first and second update-management tables; the first and second update-management tables corresponding respectively to the first and second storage devices and respectively indicating any update to each of the data blocks of the respective first and second storage devices, col. 2, lines 10-24, Figs. 1, 2).*

As to claims 9, 23, 37, Innan teaches acquiring a lock from a lock mechanism before the updating; and releasing the lock after the writing *(i.e. a mirror-split request, col. 3, lines 53-64).*

As to claims 10, 24, 38, Innan teaches the lock mechanism is maintained independent to the first and the second storage images *(i.e. "mirror-split" refers to an operation state in which updating to the LU0 (31) is continued, but updating to the LU1 (32) is stopped, col. 3, lines 53-64).*

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As to claims 11, 25, 39, Innan teaches receiving a request to read from a data block on the second storage volume; determining whether the data block is stored in the first image or the second image, based the data structure associated with the second storage image; reading the data block from the first image if the data block is stored in the first image; and reading the data block from the second image if the data block is stored in the second image (*i.e. starting a process of managing whether updating is carried out or not to each of data blocks of the first and second storage devices using first and second update-management tables; the data blocks being respectively partitioned in the first and second storage devices; and the first and second update-management tables corresponding respectively to the first and second storage devices and respectively indicating any update to each of the data blocks of the respective first and second storage devices; at a second time which may be after the first time or at the same time as the first time, col. 2, lines 10-39*).

As to claims 12, 26, 40, Innan teaches examining a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the second storage image (*i.e. a backup and storage system which has a method for managing first and second storage devices structuring a mirrored pair using first and second update-management tables; the first and second update-management tables corresponding respectively to the first and second storage devices and respectively indicating any update to each of the data blocks of the respective first and second storage devices, col. 2, lines 10-24, Figs. 1, 2*).

As to claims 13, 27, 41, Innan teaches acquiring a lock from a lock mechanism before the determining; and releasing the lock after the reading (*i.e. "mirror-split" refers to an operation state in which updating to the LU0 (31) is continued, but updating to the LU1 (32) is stopped, col. 3, lines 53-64*).

As to claims 14, 28, 42, Innan teaches the lock mechanism is maintained independent to the first and the second storage images (*i.e. "mirror-split" refers to an operation state in which updating to the LU0 (31) is continued, but updating to the LU1 (32) is stopped, col. 3, lines 53-64*).

As to claims 44, 45, 46, Innan teaches the second I/O process is capable of accessing the same data, via the second storage volume, as the first I/O process (*i.e. a mirrored pair, col. 2, lines 10-39*).

Response to Arguments

8. Applicant's arguments regarding the prior arts do not suggest "creating a data structure, in response to the command, for at least a second image which corresponds to a second storage volume, the second storage volume storing changes to the first storage volume occurring after receipt of the command", with respect to claims 1-2, 4-16, 18-30, 32-46 have been considered but are moot in view of the new ground(s) of rejection.

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Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Miranda Le whose telephone number is (571) 272-4112. The examiner can normally be reached on Monday through Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Cottingham, can be reached on (571) 272-7079. The fax number to this Art Unit is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Miranda Le
June 06, 2007


JOHN COTTINGHAM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100